

Ejercicios semana 6

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- **Ejercicio 1:** Generar una muestra de tamaño $n=200$ perteneciente a una población normal $N(10; 2^2)$.

```
#Muestra de una distribución normal
NormalSamples <- as.data.frame(matrix(rnorm(1*200, mean=10, sd=4), ncol=200))
rownames(NormalSamples) <- "sample"
colnames(NormalSamples) <- paste("obs", 1:200, sep="")
NormalSamples <- within(NormalSamples, {
  mean <- rowMeans(NormalSamples[,1:200])
})
NormalSamples
```

	obs1	obs2	obs3	obs4	obs5	obs6	obs7	obs8
sample	10.0227	11.27462	8.203732	4.810003	7.382203	7.896278	9.237484	10.13033
	obs9	obs10	obs11	obs12	obs13	obs14	obs15	obs16
sample	6.435591	8.054118	14.12739	7.566532	16.02987	6.721881	6.671172	8.850403
	obs17	obs18	obs19	obs20	obs21	obs22	obs23	obs24
sample	14.06861	5.608143	11.89095	13.61836	10.62007	8.837902	10.86132	9.976998
	obs25	obs26	obs27	obs28	obs29	obs30	obs31	obs32
sample	10.45685	9.752812	4.877718	11.05689	10.15191	15.52484	8.827038	9.62045
	obs33	obs34	obs35	obs36	obs37	obs38	obs39	obs40
sample	6.529906	6.898534	7.020855	8.037184	11.44269	13.82176	16.34492	10.29138
	obs41	obs42	obs43	obs44	obs45	obs46	obs47	obs48
sample	8.452216	8.024339	6.940422	11.07988	10.49277	6.34273	6.42717	1.766716
	obs49	obs50	obs51	obs52	obs53	obs54	obs55	obs56
sample	9.502094	9.368867	14.10105	10.4564	11.79901	6.890391	6.331735	11.35711
	obs57	obs58	obs59	obs60	obs61	obs62	obs63	obs64
sample	14.82373	8.158437	13.87822	12.46164	13.68071	3.845601	9.982553	7.80965
	obs65	obs66	obs67	obs68	obs69	obs70	obs71	obs72
sample	10.16265	12.11624	8.091392	10.17986	5.840086	5.575378	11.16899	13.49405
	obs73	obs74	obs75	obs76	obs77	obs78	obs79	obs80
sample	14.34319	5.01771	13.91968	4.129971	6.240192	10.77213	4.973402	11.28156
	obs81	obs82	obs83	obs84	obs85	obs86	obs87	obs88
sample	10.12356	12.65563	15.76697	8.087372	8.213809	10.38694	11.66347	8.030526
	obs89	obs90	obs91	obs92	obs93	obs94	obs95	obs96
sample	9.858075	8.812474	10.8903	8.455491	9.270196	10.27541	12.8113	11.34276
	obs97	obs98	obs99	obs100	obs101	obs102	obs103	obs104
sample	4.192352	5.811914	15.94981	9.657953	18.56423	6.956743	12.83085	9.74074
	obs105	obs106	obs107	obs108	obs109	obs110	obs111	obs112
sample	14.8135	3.339922	13.67467	13.87845	7.855681	4.685104	12.98214	10.30664
	obs113	obs114	obs115	obs116	obs117	obs118	obs119	obs120
sample	9.40426	5.767329	8.145295	4.605227	13.70327	5.918293	10.22691	13.10244
	obs121	obs122	obs123	obs124	obs125	obs126	obs127	obs128
sample	7.580176	14.55525	12.19002	14.4697	6.306337	14.27951	6.938653	11.36487
	obs129	obs130	obs131	obs132	obs133	obs134	obs135	obs136

```

## sample 9.398787 5.362512 8.084944 13.32929 8.872281 16.36435 10.15014 8.896486
##      obs137  obs138  obs139  obs140  obs141  obs142  obs143  obs144
## sample 10.03872 9.092677 11.7558 9.517997 8.715264 7.369727 11.20882 8.903755
##      obs145  obs146  obs147  obs148  obs149  obs150  obs151  obs152
## sample 15.90348 8.938897 11.02334 8.439347 12.95693 5.629923 12.91807 7.804946
##      obs153  obs154  obs155  obs156  obs157  obs158  obs159  obs160
## sample 8.636557 13.17852 12.51995 13.50049 9.841298 6.673072 8.462893 18.31178
##      obs161  obs162  obs163  obs164  obs165  obs166  obs167  obs168
## sample 5.911709 10.90262 3.065381 6.958166 8.67281 8.354373 13.33968 15.33271
##      obs169  obs170  obs171  obs172  obs173  obs174  obs175  obs176
## sample 3.183373 8.031249 12.27404 12.54926 12.01663 11.4956 4.801961 11.22251
##      obs177  obs178  obs179  obs180  obs181  obs182  obs183  obs184
## sample 5.828408 11.88697 9.12078 1.181484 9.33023 11.15789 13.34942 7.516117
##      obs185  obs186  obs187  obs188  obs189  obs190  obs191
## sample 7.307431 7.309413 2.065268 5.382871 12.4483 -0.03640857 7.686814
##      obs192  obs193  obs194  obs195  obs196  obs197  obs198  obs199
## sample 11.58035 9.81987 13.38538 15.81344 8.738969 11.56473 4.378473 14.70669
##      obs200  mean
## sample 15.95901 9.743349

```

- **Ejercicio 2:** ¿Cuál es la probabilidad a la derecha de 18.55 para una Variable aleatoria X con distribución Chi-cuadrado de 12 grados de libertad?

```
#probabilidad acumulada de chi-cuadrado  
pchisq(c(18.55), df=12, lower.tail=FALSE)
```

```
## [1] 0.09998251
```

- **Ejercicio 3:** Generar 100 números aleatorios de una distribución Normal con media 4.5 y desviación estándar 0.75

```
AleatorioNorm <- as.data.frame(matrix(rnorm(1*100, mean=4.5, sd=0.75), ncol=100))
rownames(AleatorioNorm) <- "sample"
colnames(AleatorioNorm) <- paste("obs", 1:100, sep="")
AleatorioNorm
```

```
##      obs1      obs2      obs3      obs4      obs5      obs6      obs7      obs8
## sample 4.149318 4.414371 3.769777 2.193816 3.990504 5.674338 4.689138 4.442847
##      obs9      obs10     obs11     obs12     obs13     obs14     obs15     obs16
## sample 3.875064 4.150849 4.31884 5.207414 3.627345 3.315026 5.07302 5.081896
##      obs17     obs18     obs19     obs20     obs21     obs22     obs23     obs24
## sample 4.14834 4.499458 4.94253 3.994429 4.622468 3.672681 4.591409 4.653111
##      obs25     obs26     obs27     obs28     obs29     obs30     obs31     obs32
## sample 3.418119 4.263002 2.785872 3.699319 3.123127 4.485203 5.631522 5.210914
##      obs33     obs34     obs35     obs36     obs37     obs38     obs39     obs40
## sample 3.751787 3.615209 5.139945 4.785298 4.743848 4.670889 4.743632 4.919275
##      obs41     obs42     obs43     obs44     obs45     obs46     obs47     obs48
## sample 3.921014 4.081274 4.790146 3.592849 5.286211 5.027912 4.486329 4.40458
##      obs49     obs50     obs51     obs52     obs53     obs54     obs55     obs56
## sample 4.063554 4.86108 5.739981 4.884815 4.77221 4.768599 4.558056 3.738703
##      obs57     obs58     obs59     obs60     obs61     obs62     obs63     obs64
## sample 4.533353 4.834167 4.581813 4.573436 3.87034 5.446536 4.588383 3.602732
##      obs65     obs66     obs67     obs68     obs69     obs70     obs71     obs72
## sample 4.75936 4.724106 5.114107 4.290413 4.534834 3.030611 4.57221 5.049987
##      obs73     obs74     obs75     obs76     obs77     obs78     obs79     obs80
## sample 4.969831 4.005989 5.377838 5.016131 5.742491 5.163149 3.772805 5.443964
##      obs81     obs82     obs83     obs84     obs85     obs86     obs87     obs88
## sample 2.545048 4.914474 3.495023 4.483034 4.385894 5.533651 4.845029 4.226371
##      obs89     obs90     obs91     obs92     obs93     obs94     obs95     obs96
## sample 4.287666 4.317993 6.00179 5.178973 3.081856 3.84446 4.62294 4.725629
##      obs97     obs98     obs99     obs100
## sample 3.896834 3.606563 3.518117 4.225868
```

- **Ejercicio 4:** Generar números aleatorios de una distribución exponencial, si la media es 2500.

```
ExponentialSamples <- as.data.frame(matrix(rexp(1*100, rate=2500), ncol=100))
rownames(ExponentialSamples) <- "sample"
colnames(ExponentialSamples) <- paste("obs", 1:100, sep="")
ExponentialSamples
```

```
##          obs1          obs2          obs3          obs4          obs5
## sample 0.0002206643 6.342216e-05 6.004998e-05 0.000296516 0.0001809668
##          obs6          obs7          obs8          obs9          obs10
## sample 0.001668757 0.0002511741 0.001218861 0.000116859 0.000192424
##          obs11         obs12         obs13         obs14         obs15
## sample 4.695555e-05 0.000268649 0.0002210148 0.0003805752 0.001001136
##          obs16         obs17         obs18         obs19         obs20
## sample 0.0003304633 0.000132858 6.839229e-05 9.555397e-05 4.132618e-05
##          obs21         obs22         obs23         obs24         obs25
## sample 2.600623e-05 0.0002644355 0.001313922 0.0005803596 0.0003258452
##          obs26         obs27         obs28         obs29         obs30
## sample 0.0006704966 0.0001905593 0.001566857 0.0005651789 1.656521e-05
##          obs31         obs32         obs33         obs34         obs35
## sample 0.003571196 0.0002269448 0.000517929 0.0006887449 5.370445e-05
##          obs36         obs37         obs38         obs39         obs40
## sample 0.0002400093 6.662525e-05 0.0007646021 0.001212103 4.85874e-05
##          obs41         obs42         obs43         obs44         obs45
## sample 0.001027188 0.0006994346 0.0007313971 2.14483e-05 0.0003461529
##          obs46         obs47         obs48         obs49         obs50         obs51
## sample 0.0003802464 0.0001013622 0.00110403 0.000309768 0.00030761 0.0006335536
##          obs52         obs53         obs54         obs55         obs56
## sample 0.0004600206 0.0002096991 0.0009343198 0.0002053588 0.0002104207
##          obs57         obs58         obs59         obs60         obs61
## sample 2.470382e-05 0.0001923876 0.001833854 0.0003724452 0.002525466
##          obs62         obs63         obs64         obs65         obs66
## sample 0.002782618 0.000204817 0.0002297391 0.0001227206 0.001091373
##          obs67         obs68         obs69         obs70         obs71
## sample 0.0001797017 0.0009073328 0.0001879615 0.0007889167 9.294255e-05
##          obs72         obs73         obs74         obs75         obs76
## sample 0.0003207198 0.001137285 0.001486146 4.714325e-05 1.001183e-06
##          obs77         obs78         obs79         obs80         obs81
## sample 0.0001420239 8.459119e-05 0.0001501067 0.0001415138 0.0007750769
##          obs82         obs83         obs84         obs85         obs86
## sample 7.105128e-05 0.0001541226 0.0001382287 5.468963e-05 0.0002575576
##          obs87         obs88         obs89         obs90         obs91
## sample 8.159471e-05 8.966833e-05 0.0002108077 0.000330856 0.0003510353
##          obs92         obs93         obs94         obs95         obs96
## sample 0.0001773214 0.0001097677 0.0003605759 0.0003154239 0.0004216919
##          obs97         obs98         obs99         obs100
## sample 0.0004168214 0.0001330917 0.0004851997 0.0005437545
```